class." "To what conditions of deposit do fossils of the following groups of genera respectively point?—1. Unio, Paludina, and Cyrena. 2. Nautilus and Globigerina. Illustrate this by reference, in each case, to a British example."

"Explain what is meant by 'arterial tonus.' State generally what is the origin, course, distribution, and mode of termination of the nervous channels by which the brain and spinal cord influence arterial tonus." "Describe the rhythmical respiratory movements of the glottis in mammalian animals, referring to the mode of action of the most important muscles which are concerned in their production."

I only wish to point out the contrast in difficulty between the above sets of questions, without offering any opinion as to the suitability of either. In zoology and comparative anatomy the following question seems rather unusual for such an examination.—"Briefly describe the internal economy of a beehive, and the mutual relationships of its inmates." Here is a question in geographical distribution:—"In what countries are the following animals found—the orang-utan, vampire-bat, tapir, leopard, elk, emu, and python? State what principles of zoogeography are deducible from their distribution." It seems to me that a knowledge of the distribution of all the more important species is far beyond the pass qualification for an honours' examination. In admitting men to such a qualification, tests should rather be applied which every student of a subject ought to be able to respond to; but it is questionable whether we can yet expect every student of zoology and comparative anatomy to "state concisely the doctrine of evolution as employed in biology."

It is not stated in how many subjects a candidate must pass in order to obtain honours; nor are any named as essential. There is a strong feeling that elementary chemistry and physics should be made compulsory on all, and that students should be allowed to present themselves in these subjects at an earlier period of their course. G. T. BETTANY

NOTES

WE are glad to learn that upwards of 1,000*l.* has been subscribed towards the Chemical Society Research Fund, so that the Council are now in a position to accept Dr. Longstaff's generous offer of 1,000*l.* to form a permanent fund. We only hope that the fund may still be largely increased.

THE Albert Medal of the Society of Arts for "distinguished merit in promoting Arts, Manufactures, and Commerce," has this year been unanimously awarded to Sir George B. Airy, K.C.B., the Astronomer Royal, for "Eminent Services rendered to Commerce by his Researches in Nautical Astronomy, and in Magnetism, and by his Improvements in the Application of the Mariner's Compass to the Navigation of Iron Ships." A prize of a Gold Medal was awarded to Mr. Hearson for the best "Revolution Indicator," which should accurately inform the officer on deck, and the engineer in charge of the engine, what are the number of revolutions of the paddles or screw per minute without the necessity of counting them. For papers read before the Society medals have been awarded as follows:—To Mr. Clements R. Markham, C.B., for his paper "On the Cultivation of Caoutchouc-yielding Trees," Mr. W. T. Thornton for his paper "On Irrigation Works in India," Mr. E. Hutchinson for his paper "On the Development of Central Africa," Mr. W. Valentin for his paper "On Dextrine-Maltose, and its use in Brewing."

MR. H. N. MOSELEY, M.A., has been elected to an Extraordinary Fellowship at Exeter College, Oxford, tenable for five years under a special ordinance sanctioned by the Visitor. Mr. Moseley, who was educated at Exeter College, proceeded to his B.A. degree in 1868, having obtained a "first class" in natural science in Trinity term of the same year. He was elected in 1869 Radcliffe Travelling Fellow, and has recently been one of the scientific staff of the expedition of H.M.S. *Challenger*.

M. WADDINGTON intends to establish Fellowships in the several French Academies in imitation of the Fellowships of the English Universities. The French Fellowships are to hold good only for a limited period, and will not be subject to the restriction of celibacy. The credits will soon be asked for from the French Assemblies.

IN the University of London D.Sc. Examination Mr. Thomas Carnelley and Mr. Frank Clowes have passed in Inorganic Chemistry, Mr. James Gordon MacGregor in Electricity (treated experimentally), Mr. Edward Bibbins Aveling in Vegetable Physiology, and Prasanna Kumár Ráy in Logic and Moral Philosophy.

ON Thursday last the master and other members of the London Clothworkers' Company visited Leeds, in order to inspect the working of the Textile Industries' department of the Yorkshire College of Science, which was founded and endowed by the munificence of the Company. The visitors expressed their satisfaction with the results of the endowment, and the master, Mr. Wyld, in replying to the toast of the Company, showed that he had an unusually high idea of the duties which devolved on the London Companies as trustees of the large funds which belonged to them. While placing a high value on technical education, moreover, he expressed the opinion that any special education divorced from, or not based on, wide general culture, would be defective and inefficient.

MR. LLOYD, the president of the trustees of the Fisk donation for the construction and fitting up of the San Francisco Observatory, arrived in Paris at the end of June. His first visit was to M. Leverrier, who gave him every assistance in his power to enable him to fulfil the object of his mission. Mr. Lloyd is at liberty to use the observatory grounds for any experiments in connection with his large refractor, which it is intended to construct. M. Leverrier concurred with him in not attempting to construct a lens of more than one metre in diameter. The money at the disposal of Mr. Lloyd is 200,000*l.* The law-suit is at an end, and the donation of a similar sum for the museum is cancelled, but the astronomical donation has been confirmed.

PROF. H. G. SEELEY has been appointed Professor of Geography at the Queen's College for Ladies, Harley Street.

THE Geologists' Association are to make an excursion to the North Wales Border on Monday, July 17, and five following days.

THE forty-second annual meeting of the Statistical Society was held on June 27, at the Society's Rooms, the President, Mr. James Heywood, F.R.S., in the chair. The report read showed that the Society continues to advance steadily in numbers and in public estimation.

WE have before us the commencing number of "The Proceedings of the Linnean Society of New South Wales," which contains papers by Mr. Brazier, C.M.Z.S., on a new species of Australian and Solomon Island shells; by Mr. Ramsay on a new species of *Ptilotis* from the Endeavour River, with some remarks on the natural history of the East Coast Range near Rockingham Bay, and by Mr. Maclean, the President of the Society, on a new species of *Dandrophis* from Cleveland Bay. We are convinced that a work so well commenced has the good wishes of all interested in the diffusion of science.

MR. ALEXANDER AGASSIZ, in his recent trip to Peru, found occasion to conclude that the Pacific, within a comparatively recent time, extended through gaps in the Coast Range, and made an internal sea which stood at a height of not less than 2,900 feet, and probably much above this. This is proved by the fact of the occurrence of coral limestone 2,900 or 3,000 feet above the sea level, about twenty miles in a straight line from the Pacific. The corals are of modern aspect, although the species are undescribed. The fact that there are extensive saline basins at a height of even 7,000 feet on the coast of Peru would seem to indicate that the submergence was at one time still greater than that suggested. Indeed, eight species of *Allorchestes*, a salt-water genus of amphipod crustaceans found in Lake Titicaca, would seem to indicate that this lake, 12,500 feet above the sea, must have been at one time at the sea-level.

WE have received Part II. of vol. ii. of the *Transactions* of the Norfolk and Norwich Naturalists' Society. The Society, which has just completed its seventh year, has gradually been increasing in numbers, and there are now 150 members, many of whom are well known to the scientific world. The Society's efforts to carry out the objects for which it was established have been, on the whole, successful. Of the papers printed *in extenso*, a series of twenty letters forming a most interesting correspondence between Gilbert White and Robert Marsham, is by far the most important. This is rendered still more interesting by the valuable notes contributed by Mr. Harting and Prof. Newton. Of the other original papers, we may mention the Meteorological Report and the Ornithological Report, by Henry Stephenson, F.L.S. (author of the "Birds of Norfolk"); also the concluding portion of Mr. Geldart's list of the plants known to occur in Norfolk. The latter forms a portion (the sixth) of the Fauna and Flora of the County, which the Society is printing. Among the occasional notes and observations some interesting facts are recorded.

LIEUT. MINTZER, of the U.S. Navy, we learn from *L'Explorateur*, is organising a scientific expedition to the Arctic Seas, at Norwich, Connecticut.

A VERY destructive earthquake was felt at Corinth (Greece) on June 26, and another of the same date in Austria.

AT the Loan Collection during the present week, twelve demonstrations of apparatus were given on Monday, the same number on Tuesday, and six on Wednesday; four will be given to-day, four to-morrow, and ten on Saturday.

TWO handsome works have just been published by Masson of Paris—"Le Microscope, son Emploi et ses Applications," by Dr. J. Pelletan, with 278 figures and four plates, and "Traité d'Électricité Statique," by Prof. E. Mascart, two vols., with 298 figures.

PETERMANN'S *Mittheilungen* for June contains a considerably detailed account of the results of the discovery of Franz-Josef Land by the Payer-Weyprecht Expedition, founded on the work recently published at Vienna by Lieut. Payer. Accompanying the paper is the first satisfactory map yet published of the newly-discovered land, in which all the details of the sea and land are shown, as well as all the names imposed by the leaders of the expedition. Dr. Couto de Magalhães' "Travels in Araguaya" are concluded, and a brief synoptical summary is given of Walker's new statistical atlas of the United States.

THE Lindley Library, to which we referred last week (p. 200), does not belong to the Horticultural Society, nor was it bought by it. It was purchased with part of the surplus of the proceeds of the International Horticultural Exhibition and Botanical Congress held in London in 1866, and is vested in the hands of sundry trustees, who will be grateful for any donation. By permission of the Horticultural Society the library is deposited in its rooms.

THE twenty-eighth annual meeting of the Somersetshire Archæological and Natural History Society will be held at Bath on July 18, 19, and 20, under the presidency of Mr. Jerom Murch. Several excursions have been arranged.

THE first aquarium erected in Scotland was opened at Rothesay, in the island of Bute, last Thursday. The situation of the aquarium is in every respect favourable, and there is a large amount of tank accommodation, which has been arranged so as to contain both salt and fresh-water fish. The fresh-water tanks are perhaps the largest of the kind in the country, one of them containing over 20,000 gallons of water. A seal-pond is being constructed, and an eight-horse power engine sends the fresh and salt water from the reservoirs below to the tanks above. The reservoir for the former is capable of containing 90,000 gallons, while that for the latter has a capacity of 150,000 gallons. It is hoped that the aquarium will do good service as a school for practical natural history.

VARIOUS sanitary measures (according to Dr. Tholozan) have recently been adopted by the Turkish and Persian Governments with reference to the outbreak of plague, which commenced in Mesopotamia in the early part of the year. Since the beginning of March a sanitary *cordon* has been established on the north of the invaded territory, on the most frequented route of Kurdistan and Syria, between Tecrit and Kifri. On the south a quarantine of fifteen days is obligatory since April 1 on all vessels sailing on the Tigris and the Euphrates. It is at Kourna, at the confluence of these rivers. The ports of the Persian Gulf are protected by a quarantine which vessels from infected localities have to undergo at the island of Kezzer, formed by junction of the Chotel Aral and the Karoun. Since April 10 all communications by land between Persia and Mesopotamia are subject to a quarantine of fifteen days. For three years, it may be added, all pilgrimages into the infected country, by Persian subjects, have been interdicted. To fully comprehend this system of protection it should be remembered that on the west and north-west, for an extent of three degrees of latitude, no artificial barrier has been or can be established against the plague; but there are, happily, natural obstacles, which prove much more efficacious, the infected region being there bounded by the deserts of Syria and Mesopotamia. The greater rarity of communications there renders restrictive measures, on the arriving caravans, easier. Judging from past outbreaks of plague, it was anticipated that the present would decline in June (after reaching its *acmé* in the end of May), and disappear from Mesopotamia in July. But it may send offshoots to Bussora, Bouchère, and Arabistan, and a still greater danger is the introduction of germs of the plague into the high plateaux of Anatolia, Kurdistan, and Persia.

AN interesting addition to the literature of insectivorous plants is furnished by a reprint, by Casimir De Candolle, from the *Archives des Sciences Physiques et Naturelles*, "Sur la Structure et les Mouvements de Feuilles de *Dionæa muscipula*." With regard to the power of digestion, M. De Candolle comes to a conclusion opposed to that of Darwin, that the absorption of animal substances is not directly utilised by the leaves, and is not necessary to the development of the plant. He considers their anatomical structure favourable to the hypothesis that the movement of the two valves of the leaf results from variations of turgidity of the parenchyma of their upper surface.

A SINGULAR and useful society is in the way of formation at Paris. Seventy-two institutions of France have met in the Hotel of the rue de Grenelle to organize a general topographical association. Each institution becoming a member engages to prepare a topographical map of its commune, with roads, streams, mountains, &c. As the number of institutions in France exceeds 40,000, the number of registered adherents is very small indeed; but more are expected to join, especially if the Government takes interest in the association. The scientific value of such maps may not be great, but the result in the diffusion of geographical methods and promotion of knowledge is unquestionable.

CAPT. ROUDAIRE has delivered before the Geographical Society of Paris a lecture on the results of the survey of the Tunisian

Chotts. The measures taken last year on the Algerian side have been verified. The same level has been found for the connecting station with an immaterial difference of 2·80 metres in favour of the operation. The altitude at Gabes is only 46 metres, which is no obstacle to the channel being opened. Every objection raised by an Italian Commission has been set aside. MM. d'Abbadée and de Lesseps promised their help and testified their satisfaction.

THE half-yearly general meeting of the Scottish Meteorological Society will be held to-morrow. The business before the meeting will be—1. Report from the Council of the Society. 2. Notice as to observations of the velocity of the wind at different heights, by Thomas Stevenson, F.R.S.E., F.G.S. 3. Meteorological Register kept by James Hoy, at Gordon Castle from 1781 to 1827, communicated to the Society by His Grace the Duke of Richmond and Gordon, with remarks thereon by Mr. Buchan, secretary. This, we believe, is a very valuable register.

MR. E. F. FLOWER has published "A Sequel" to his much-needed pamphlet on "Bits and Bearing Reins." We are glad to see that his efforts to abolish the useless and cruel bearing-rein, and to introduce a rational and humane, and therefore scientific, way of managing horses has been largely successful. We cannot see how any man who wishes to be "merciful to his beast" can, after reading Mr. Flower's pamphlet, persist in the use of the bearing-rein, which after all is quite unnecessary, and no doubt tends to make a horse contract vices.

NOS. 4 and 5 of the *Iowa Weather Review* give a very good summary of the weather of the State of Iowa during December, January, and February last, dividing the season into nine decades. The winter was unusually mild, being 10°·5 above the average of Iowa winters, while during the third decade of December the excess rose to 19°·7. Less than an inch of rain fell in the north-west of the State, but in the central countries the fall was large, amounting to 9·60 inches at Davenport. Several interesting practical tables are added showing the days of thaw when the maximum exceeded 32°, days of frost when the minimum fell below 32°, and days of cold when the temperature fell to zero or lower. Sudden colds following in the wake of storms are also detailed, together with the barometric rise, and the velocity and direction of the wind, accompanying these great falls of temperature, which form so marked a feature in the climate of America. The alleged change of climate from the cultivation of the soil and the destruction of forests by which the summers, as stated, are becoming warmer and the winters colder, is a question which deserves to be carefully examined.

WE have received "Results of Meteorological Observations made at the Bath Royal Literary and Scientific Institution during the Ten Years ending February, 1875," by the Rev. Leonard Blomefield. The pamphlet, which is an extract from the "Proceedings of the Bath Natural History and Antiquarian Field Club," is a conscientious piece of work, evidently got up with the greatest care. The instruments appear to be fairly placed, except the rain-gauge, which is fixed in a faulty position, viz., at the top of a building. The monthly and yearly mean temperatures have been deduced from the 9 A.M. observations corrected for diurnal range, though it may well be doubted whether "*means*" can be calculated from observations made at only one hour of the day and whether any diurnal range corrections yet exist applicable to Bath. Some very interesting comparisons are drawn between the climate of Bath and other parts of England, with on the whole a just apprehension on the part of the author of the misleading nature of data when based on the observations of different years. Some of the differences, however, pointed out by Mr. Blomefield, such as the higher temperature of Bath as compared with Exeter during January and February disappear when a comparison is made from observations taken during the same years at each place, or from results obtained by the method of differentiation. Among the interesting results arrived at is the higher temperature of the river as compared with that of the air at Bath amounting to 2°·5 on a mean of the year, rising in June to 4°·6, and falling in February to 0°·5. In many respects the pamphlet is a valuable contribution to the meteorology of the south-west of England.

DR. H. HAMBERG, Assistant Professor of Meteorology at the University of Upsal, has written in the "Proceedings of the Royal Academy of Sciences," Stockholm, a very interesting paper on the development of the barometric minimum accompanying the thunderstorms which occurred in Sweden and Norway from July 14 to 20, 1872. From the data before him, Dr. Hamberg concludes that the barometer fell most where the sky was cloudless, and that the fall of heavy rain was generally attended with a rise rather than a fall of the barometer, much in the same way as Dr. Hann has shown to take place within the tropics at Batavia. The question is as difficult as it is important in meteorology, and the investigation of the behaviour of the barometer during our summer thunderstorms is likely to lead to most valuable results.

THE additions made to the Royal Aquarium, Westminster, during the past week are as follows:—A large collection of fresh-water fish, including Carp, Bream, Chub, Perch, Roach, and Trout, presented by the Earl of Aylesford; Sand-eels (*Ammodytes lancea*), Gemmeous Dragonettes (*Callionymus lyra*), Lump-fish (*Cyclopterus lumpus*), Five-bearded Rocklings (*Motella mustela*), Sea Bream (*Cantharus lineatus*), a shoal of young Lobsters (*Homarus vulgaris*), hatched in the tanks.

THE additions to the Zoological Society's Gardens during last week include eleven Lineated Pheasants (*Euplocamus lineatus*), nine Amherst Pheasants (*Thaumalea amherstiæ*), nine Gold Pheasants (*T. picta*) and two Peacock Pheasants (*Polyplectron chinquis*), bred in the Gardens; a Cape Buffalo (*Bubalus caffer*).

SCIENTIFIC SERIALS

THE January number of Reichert and Du Bois-Reymond's *Archiv* opens with the conclusion of L. Dittmer's lengthy communication on double monsters.—Carl Sachs describes and figures the terminations of nerve fibres in certain tendons.—In a long controversial article, Prof. Hitzig defends his own and Fritsch's conclusions with respect to the functions of the cerebrum against Hermann, Braun, Carville, and Duret.—F. Boll's article on the Savian vesicles found in the torpedo about the nasal orifices and between the external edges of the electrical organs and the limb-cartilages, is very interesting, because he demonstrates the existence in their epithelium of spindle-shaped cells corresponding in character to those so commonly found in special sense organs.—Dr. Colasanti, of Rome, gives an account of the results of section of the olfactory nerve in the frog. He finds that there is no consequent alteration in the nutrition or appearance of the olfactory cells or of the peripheral ramifications of the pale nerve-fibres.—Dr. Colasanti, in another short memoir shows that the fertilised hen's egg may be reduced in temperature to from – 7° to – 10° C. without its vitality being destroyed or in any way interfered with.—Rabl-Rückhard contributes an elaborate account of the brain and cerebral nerves of the black ant (*Camponotus ligniperdus*).

The March number of the *Archiv* contains a very interesting account by P. Guttmann of his new experiments on respiration. Investigating the respiratory pause following on inspiration, he found that in vagotomised rabbits this pause does not occur. The possible reasons for this are discussed. In rabbits, in whom apnœa has been produced, it is always found that when the apnœa terminates, an inspiration, not an expiration, is the first phenomenon.—Bernstein and Steiner contribute an important paper on the transmission of contraction and the negative variation in the muscles of mammalia; but the intricacy of the sub-